

Advanced Materials**ARALDITE[®] AW 139 Resin
Hardener XB 5323****HEAT- AND CHEMICAL-RESISTANT EPOXY ADHESIVE**

DESCRIPTION

ARALDITE AW 139 Resin/Hardener XB 5323 epoxy adhesive is a two-component, thixotropic, room-temperature curing paste. It features high strength and toughness as well as good environmental stability and chemical resistance.

ARALDITE AW 139 resin/XB 5323 hardener epoxy adhesive is well suited for bonding electronic components, GRP structures, and other parts that may be exposed to elevated temperatures and/or aggressive environments.

APPLICATIONS

Metal
Ceramics
GRP
Electronic components

ADVANTAGES

Heat resistant to 248°F (120°C)
Withstands exposure to water and a wide variety of chemicals
Gap-filling, non-sagging up to 0.2 inch (5 mm) thickness
Bonds well to a wide variety of substrates

TYPICAL PROPERTIES

<u>Property</u>	<u>Test Method</u>	<u>Test Values⁽¹⁾</u>	
		<u>Resin</u>	<u>Hardener</u>
Color/appearance	Visual	Beige Paste	Gray Thixotropic Paste
Specific Gravity	ASTM D-792	1.60	1.60
Viscosity, cP @ 77°F (25°C)	ASTM D-2393	70,000	130,000

TYPICAL MIXED PROPERTIES

<u>Property</u>	<u>Test Method</u>	<u>Test Values⁽¹⁾</u>
Reaction Ratio (by weight)		100R/50H
Reaction Ratio (by volume)		100R/50H
Pot Life, min. @ 77°F (25°C), 4 fl. oz. mass	ASTM D-2471	40
Mixed viscosity, cP @ 77°F (25°C)	ASTM D-2393	90,000

¹Tested @ 77°F (25°C)**RECOMMENDED CURE SCHEDULES**

<u>Temperature</u>	<u>Handling Strength</u>	<u>Minimum Cure Time</u>
50°F (10°C)	16 hours	24 hours
59°F (15°C)	9 hours	11.5 hours
77°F (25°C)	3.5 hours	6 hours
104°F(40°C)	75 minutes	105 minutes
140°F(60°C)	26 minutes	30 minutes
212°F(100°C)	6 minutes	6 minutes

PROCESSING**Application of Adhesive**

The resin/hardener mix is applied with a spatula to the pretreated and dry joint surfaces.

A layer of adhesive 0.002 to 0.004-inches (0.05 to 0.10-mm) thick will normally impart the greatest lap shear strength to a joint.

The joint components should be assembled and clamped as soon as the adhesive has been applied. Even contact throughout suffices to ensure proper cure.

Standard Test Specimens

Unless otherwise stated, the figures given below were all determined by testing standard specimens made up by lap-jointing 4-inch x 1-inch x 0.06-inch (10-cm x 2.5-cm x 1.5-mm) strips of aluminum. The joint area was 0.5 x 1 inch (12.5 mm x 2.5 cm) in each case.

TYPICAL PHYSICAL PROPERTIES

	<u>Test Method</u>
Lap Shear Strength, psi (MPa)	DIN 53283
<i>Effect of Cure Time and Test Temperature</i>	
Load applied 10 minutes after specimens reach test temperature.	
<u>Cure Cycle</u>	<u>Test Values⁽¹⁾</u>
7 days @ 77°F (25°C)	2400 (16.5)
24 hours @ 77°F (25°C) + 30 min. @ 176°F (80°C)	2600 (17.9)

¹Tested @ 77°F (25°C)

	<u>Test Method</u>	
Lap Shear Strength, psi (MPa)	DIN 53283	
<i>Effect of Test Temperature</i>		
Load applied 10 minutes after specimens reach test temperature.		
<u>Cure Cycle</u>	<u>Test Values⁽¹⁾</u>	
7 days @ 77°F (25°C)	<u>Test Temp.</u>	
	-40°F (-40°C)	1900(13.1)
	-4°F (-20°C)	2000(13.8)
	68°F (20°C)	2400(16.5)
	104°F(40°C)	2900 (20)
	140°F(60°C)	2500(17.2)
	176°F (70°C)	2400(16.5)
	212°F (100°C)	1900(13.1)
	248°F (120°C)	1300 (8.9)
	284°F (140°C)	800 (5.5)
24 hours @ 77°F (25°C) + 30 min. @ 176°F (80°C)	-40°F (-40°C)	2400(16.5)
	-4°F (-20°C)	2500(17.2)
	68°F (20°C)	2600 (17.9)
	104°F(40°C)	2500 (17.2)
	140°F(60°C)	3000 (20.6)
	176°F (70°C)	2600 (17.9)
	212°F (100°C)	2100 (14.5)
	248°F (120°C)	1400 (9.6)
	284°F (140°C)	900 (6.2)

¹Tested @ 77°F (25°C)

Lap Shear Strength, psi (MPa)**Test Method**

ASTM D-1002

Effect of Immersion

Cure cycle 16 hours @ 104°F (40°C). Immersion for 90 days in media listed.

Properties**Test Values ⁽¹⁾**

Standard - As prepared	2700 (18.6)
IMS	2750 (18.9)
Gasoline	3200 (22)
Ethyl Acetate (30 days)	3300 (22.7)
Acetic Acid 10%	2300 (15.8)
Xylene	2650 (18.2)
Lubricating Oil - HD30	2300 (15.8)
Paraffin	2600 (17.9)
Water @ 68°F (20°C)	2750 (18.9)
Water @ 194°F (90°C)	2000 (13.8)

Lap Shear Strength, psi (MPa)***Effect of Tropical Exposure***

(104°F/40°C/92% R.H.)

Cure Cycle

16 hrs. @ 104°F (40°C)

Exposure Time

0 days	2700 (18.6)
30 days	3050 (21)
60 days	3100 (21.3)
90 days	2900 (20)

¹Tested @ 77°F (25°C)

Lap Shear Strength, psi (MPa)
Effect of Heat Aging
 Cured 16 hours @ 104°F (40°C)

<u>Aging Temperature</u>	<u>Exposure Time</u>	<u>Test Values</u>
158°F (70°C)	0 days	2700(18.6)
	30 days	2800(19.3)
	60 days	2600(17.9)
	90 days	3000 (20.6)

Lap Shear Strength, psi (MPa)
Tested on Metal Substrates
 Cured 16 hours @ @ 104°F (40°C)

<u>Metal</u>	<u>Substrate Thickness (in./mm)</u>	<u>Test Values</u>
Carbon Steel	0.039/1.0	2500 (17.2)
Stainless Steel	0.039/1.0	3200 (22)
Galvanized Steel ²	0.06/1.5	1300 (8.9)
Copper	0.06/1.5	2300 (15.8)
Brass	0.06/1.5	2300 (15.8)

¹Tested @ 77°F (25°C)

²Surface degreased only, not roughened.

PHYSICAL PROPERTIES

	Test Values¹	Test Method
Tg per DMA, °F (°C)	230 (110)	ASTM D-4065
Roller Peel, pli (N/mm)	17 (3)	ISO 4578

¹ Surfaces degreased only, not roughened

DIELECTRIC PROPERTIES

	Test Values
Dielectric Strength, V/ml	450
Volume Resistivity, Ω cm	6.1E+15
Dielectric Constant, @ 1KHz	1.0
Loss Tangent, % @ 1KHz	3.9

STORAGE AND SHELF LIFE

ARALDITE epoxy adhesive components should be stored in their original, sealed containers at room temperature. When stored at temperatures from 59-77°F (15-25°C), the resin and hardener will remain in useable condition for 12 months from date of shipping from Huntsman.

**SAFETY/HANDLING
PRECAUTIONS**

Do not use or handle this product until the Material Safety Data Sheet has been read and understood

Personal Hygiene*Safety precautions at workplace*

Protective clothing	Yes
Gloves	Essential
Arm protectors	Recommended when skin contact is likely
Goggles/safety glasses	Yes

Skin protection

Before starting work	Apply barrier cream to exposed skin
After washing	Apply barrier or nourishing cream

Cleansing of contaminated skin

Dab off with absorbent paper, wash with warm water and alkali-free soap, then dry with disposable towels. Do not use solvents.

Clean shop requirements

Cover workbenches/areas with light colored paper. Use disposable beakers.

Disposal of spillage

Soak up with sawdust or cotton waste cloth and deposit in plastic-lined bin.

Ventilation

Of workshop	Renew air 3 to 5 times an hour
Of workplaces	Exhaust fans should be used to prevent operators from inhaling vapors.

FIRST AID

Contamination of the eyes by resin, hardener or mix should be treated immediately by flushing with clean, running water for 10 to 15 minutes. A doctor should then be consulted.

Material smeared or splashed on the *skin* should be dabbed off, and the contaminated area then washed and treated with a cleansing cream (see above). A doctor should be consulted in the event of severe irritation or burns. Contaminated clothing should be changed immediately.

Anyone taken ill after inhaling vapors should be moved out of doors immediately.

In all cases of doubt call for medical assistance.

CAUTION:

Huntsman Advanced Materials Americas Inc. maintains up-to-date Material Safety Data Sheets (MSDS) on all of its products. These sheets contain pertinent information that you may need to protect your employees and customers against any known health or safety hazards associated with our products. Users should review the latest MSDS to determine possible health hazards and appropriate precautions to implement prior to using this material. Copies of the latest MSDS may be requested by calling our customer service group at 888-564-9318 or emailing your request to adhesives@huntsman.com.

**KEEP OUT OF REACH OF CHILDREN
FOR PROFESSIONAL AND INDUSTRIAL USE ONLY**

IMPORTANT LEGAL NOTICE

Sales of the product described herein ("Product") are subject to the general terms and conditions of sale of either Huntsman Advanced Materials LLC, or its appropriate affiliate including without limitation Huntsman Advanced Materials (Europe) BVBA, Huntsman Advanced Materials Americas Inc., or Huntsman Advanced Materials (Hong Kong) Ltd. ("Huntsman"). The following supercedes Buyer's documents.

Huntsman warrants that at the time and place of delivery all Products sold to Buyer shall conform to the specifications provided to Buyer by Huntsman.

While the information and recommendations included in this publication are, to the best of Huntsman's knowledge, accurate as of the date of publication, NOTHING CONTAINED HEREIN (EXCEPT AS SET FORTH ABOVE REGARDING CONFORMANCE WITH SPECIFICATIONS PROVIDED TO BUYER BY HUNTSMAN) IS TO BE CONSTRUED AS A REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHTS, OR WARRANTIES AS TO QUALITY OR CORRESPONDENCE WITH PRIOR DESCRIPTION OR SAMPLE, AND THE BUYER ASSUMES ALL RISK AND LIABILITY WHATSOEVER RESULTING FROM THE USE OF SUCH PRODUCT, WHETHER USED SINGLY OR IN COMBINATION WITH OTHER SUBSTANCES.

No statements or recommendations made herein are to be construed as a representation about the suitability of any Product for the particular application of Buyer or user or as an inducement to infringe any patent or other intellectual property right. Buyer is responsible to determine the applicability of such information and recommendations and the suitability of any Product for its own particular purpose, and to ensure that its intended use of the Product does not infringe any intellectual property rights.

The Product may be or become hazardous. The Buyer should obtain Material Safety Data Sheets and Technical Data Sheets from Huntsman containing detailed information on Product hazards and toxicity, together with proper shipping, handling and storage procedures for the Product, and should comply with all applicable governmental laws, regulations and standards relating to the handling, use, storage, distribution and disposal of, and exposure to the Product. Buyer shall also take all steps necessary to adequately inform, warn and familiarize its employees, agents, direct and indirect customers and contractors who may handle or be exposed to the Product of all hazards pertaining to and proper procedures for safe handling, use, storage, transportation and disposal of and exposure to the Product, and the containers or equipment in which the Product may be handled, shipped or stored.

Araldite is a registered trademark of Huntsman Corporation or an affiliate thereof in one or more, but not all countries.

© 2007 Huntsman Advanced Materials Americas Inc.

Main Offices :

Huntsman Corporation
10003 Woodloch Forest Dr.
The Woodlands
Texas 77380
(281) 719-6000

**Huntsman Advanced Technology
Center**

8600 Gosling Rd.
The Woodlands
Texas 77381
(281) 719-7400